

SPC-417

Performance Specification

PROJECT FILE NO. 021052

Mobile Non-Destructive Assay Trailer for the OU 7-10 Glovebox Excavator Method Project (Draft)

Prepared for:
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ACRONYMS

ANSI	American National Standards Institute
ASME	American Society of Mechanical Engineers
CFR	Code of Federal Regulations
HASP	Health and Safety Plan
INEEL	Idaho National Engineering and Environmental Laboratory
MCP	management control procedure
NDA	non-destructive assay
NFPA	National Fire Protection Association
OU	operable unit
RWMC	Radioactive Waste Management Complex
TRU	transuranic

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1. SUMMARY

The performance specification for obtaining goods and services to perform non-destructive assay (NDA) of drums created by the Operable Unit (OU) 7-10 Glovebox Excavator Method Project is presented in this document.

1.1 General

The Idaho National Engineering and Environmental Laboratory (INEEL) will conduct the OU 7-10 Glovebox Excavator Method Project (hereafter referred to as the Project) to demonstrate retrieval, characterization, and interim storage of the transuranic (TRU) waste from OU 7-10 within the Radioactive Waste Management Complex (RWMC) at the INEEL.

For achieving safe and compliant storage of waste produced by the Project, a mobile NDA trailer owned and operated by a subcontractor will be used. The performance specification for the mobile NDA trailer is presented in this document.

1.2 Work Included

The subcontractor will provide a mobile NDA trailer capable of identifying the radionuclide content of the waste retrieved during the Project. The subcontractor will also provide the qualified personnel to operate the trailer (including calibration), maintain the trailer, and validate the results. The subcontractor will supply all materials to operate the trailer, including spare parts. The subcontractor will report the results. The subcontractor will set up the trailer and provide support for procedure development and for a Management Self-Assessment before operation of the trailer. The subcontractor will remove the trailer at the end of the performance period.

1.3 Work Not Included

The subcontractor will not be responsible for entering results into the INEEL tracking system.

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1.4 Materials, Equipment, and Services Furnished by the Idaho National Engineering and Environmental Laboratory

The INEEL will furnish a suitable place to park the trailer and the electrical power to operate the trailer. The INEEL will furnish the equipment and the operator to deliver drums to the feed system of the trailer and to remove drums from the discharge system of the trailer.

Restrooms, change rooms, showers, and an eating area are available at the RWMC for subcontractor use.

2. APPLICABLE CODES, PROCEDURES, AND REFERENCES

The following codes, procedures, and references shall apply to the extent referenced to herein. Latest revisions in effect at the time of contract award shall apply unless otherwise noted.

2.1 National and Local Codes

- ANSI/ASME/ASTM
 - ANSI N43.3-1993, for General Radiation Safety, "Installations Using Non-Medical X-ray and Sealed Gamma-Ray Sources, Energies Up to 10 MeV"
 - ANSI/ASME B20.1, "Safety Standards for Conveyors and Related Equipment"
- Federal Regulations (cited as *Code of Federal Regulations* [CFR])
 - 10 CFR 20, "Standards for Protection Against Radiation"
 - 10 CFR 830.120, "Quality Assurance for DOE Nuclear Facilities"
 - 10 CFR 835, "Occupational Radiation Protection"
 - 29 CFR 1910, "Occupational Safety and Health Standards"
 - 40 CFR 60, "Standards of Performance for New Stationary Sources"

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- 40 CFR 355, "Emergency Planning and Notification"
- NFPA 10-1998, "Standards for Portable Fire Extinguishers"
- NFPA 70-1999/ANSI C2, "National Electrical Code"
- NFPA 101-2000, "Life Safety Code"
- NFPA 801-1998, "Standards for Facilities Handling Radioactive Materials"
- ASME NQA-1, 1997, "Quality Assurance Program Requirements for Nuclear Facilities," American Society of Mechanical Engineers
- NFPA 90B, "Standard for the Installation of Warm Air Heating and Air-Conditioning Systems," National Fire Protection Association.

2.2 Industry Procedures and U.S. Department of Energy Orders

None

2.3 Military (National) Specification

None

2.4 Related Specifications

MCP-2742, "Temporary Facilities."

2.5 References

- *Acceptable Knowledge Document for INEL Stored Transuranic Waste – Rocky Flats Plant Waste*, INEL-96/0280
- *Idaho National Engineering and Environmental Laboratory Reusable Property, Recyclable Materials, and Waste Acceptance Criteria*, DOE/ID-10381
- *Criticality Safety Evaluation for the OU 7-10 Glovebox Excavator Method Project*, INEEL/EXT-01-01617
- *Radioactive Waste Management Safety Analysis Report*, INEL-94/0226

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3. TECHNICAL REQUIREMENTS

3.1 General

An overview of the technical requirements is presented in this section. All requirements discussed in this section are detailed in other sections of this performance specification.

A mobile NDA trailer is needed to assay TRU content of 600 waste drums produced by the Project. Both 55- and 85-gal drums shall be assayed. The NDA trailer shall have a proven operability record on similar waste types. Startup, maintenance, and operating procedures shall be submitted and approved in advance of NDA trailer. The subcontractor shall supply a technical liaison to help in procedure preparation and to support a pre-start Management Self-Assessment.

The mobile NDA trailer shall arrive at the site on August 1, 2003, when it will be placed at a pre-selected location adjacent to the Project dig area. Within 1 week, the NDA trailer will be set up including skirting, tie-downs, and power hook-up. Following setup, the trailer will operate through a pre-start procedure to check system operability and facility safety. After pre-start, the system will operate through startup testing and quality testing (calibration and calibration verification) using approved procedures. A startup report will be prepared and a final assessment will be performed before releasing the NDA trailer for normal operation. The NDA trailer will be ready for operation by October 1, 2003.

Normal operation shall begin on October 1, 2003, and will consist of drum assay on a 24/7 basis. The drums will be produced at a rate of 30/day. All drums processed will be validated within 24 hours. A validation report will be issued each day to detail the assay results and provide technical evaluation comments, including identification of problems encountered and resolutions to the problems. Operations will continue until all drums produced by the project are assayed. The operations period is expected to run through November 30, 2003. Contingency planning requires the NDA trailer to be operable through December 31, 2003.

At the end of the subcontract, meaning when the last drum is assayed in the NDA trailer, the subcontractor will prepare and issue a summary report. The summary report is due within 1 week of assaying the last drum. Following acceptance of the summary report by the contractor, the power will be removed from the NDA trailer. The subcontractor is expected to remove the trailer within a week of removal of power.

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3.2 Make, Model, and Tag Numbers

Not applicable

3.3 Performance Requirements

- 3.3.1 The NDA trailer shall be onsite from August 1, 2003, through December 31, 2003.
- 3.3.2 The NDA trailer shall be capable of processing both 55- and 85-gal drums.
- 3.3.3 The NDA trailer shall be calibrated to assay TRU and to identify unexpected radionuclides, as detailed in Attachment A.
- 3.3.4 The NDA trailer shall have a minimum detectable limit of 50 mg of Pu-239 fissile gram equivalent.
- 3.3.5 The NDA trailer shall be capable of assaying the expected waste from the Project. The characteristics of the expected waste are detailed in Attachment B.
- 3.3.6 The NDA trailer shall be capable of processing at least 30 drums per day.
- 3.3.7 The NDA trailer will be calibrated by the subcontractor using contractor-approved procedures.
- 3.3.8 The subcontractor using contractor-approved procedures will perform corrective maintenance (if required).
- 3.3.9 Subcontractor will supply trained operators to support 24/7 operations starting on October 1, 2003. The operators will be needed until the last drum is assayed. It is expected that the last drum will be assayed by November 31, 2003. As a contingency, the subcontractor shall guarantee support through December 31, 2003.
- 3.3.10 Drums shall be assayed using the contractor-approved procedure.
- 3.3.11 Subcontractor will ensure quality of assay results by performing appropriate calibrations, background checks, and performance checks per contractor-approved procedures (see QUALITY ASSURANCE).

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- 3.3.12 The subcontractor shall supply needed calibration and performance sources and associated drums.
- 3.3.13 Unvalidated assay results will be used for immediate storage of drums and shall be provided to the contractor as soon as assays are complete and before drums are removed from the trailer discharge system.
- 3.3.14 The subcontractor shall validate data on a daily basis—meaning drum assay results shall be validated within 24 hours of performance of assay. A daily written validation report is required (see SUBMITTALS). Validation will include data analysis and interpretation.
- 3.3.15 The subcontractor shall supply technical support personnel capable of reacting to and solving technical challenges associated with assay of variable waste. It is expected that one technical support person will be available full time during the period of performance to immediately start evaluation of challenges. It is expected that additional personnel will be available on a timely basis (evaluation to begin within 24 hours).
- 3.3.16 The subcontractor shall supply a summary report within 1 week of the assay of the last drum (see SUBMITTALS).
- 3.3.17 The NDA trailer shall be removed within 1 week of removal of power from the NDA trailer.
- 3.3.18 The subcontractor shall supply support for procedure preparation and modification, as necessary, to recast procedures in site-specific formats.
- 3.3.19 The subcontractor shall supply support for the Management Self-Assessment.

3.4 Software

The software used to perform assay shall be under a quality assurance program. The subcontractor shall supply quality program documentation, as stated in SUBMITTALS.

3.5 Registered Professional Engineer Certification

None required

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3.6 Human Factors

The NDA trailer will be designed and set up to reduce manual material handling tasks and manual handling of drums, as necessary, to reduce injury potential.

3.7 Reliability and Maintainability

It is expected that the NDA trailer will not require maintenance (other than normal preventive maintenance) during the short time period of operation. However, if corrective maintenance is required, the subcontractor shall identify problems and have replacement parts onsite within 24 hours of the problem's occurrence. The subcontractor is expected to stock spare parts, as necessary, to meet this requirement.

The subcontractor will perform required maintenance using approved procedures.

3.8 Environmental Regulatory Requirements and/or Site and Operating Requirements

Operations will be done using approved procedures.

3.9 Natural Phenomena Requirement

High winds can be expected at the INEEL. The subcontractor is expected to secure the mobile NDA trailer in accordance with the requirements of MCP-2742, "Temporary Facilities." Specifically, the subcontractor shall use a properly designed support anchoring system to resist overturning and lateral movement.

4. ENVIRONMENTAL, SAFETY AND HEALTH REQUIREMENTS

4.1 Subcontractor Safety

The Integrated Safety Management System will be applied to and by the subcontractor in operation of the mobile NDA trailer. Proper training and use of approved procedures are key elements of the Integrated Safety Management System and have been detailed in this performance specification. The subcontractor will comply and implement safety requirements specified in the project Health and Safety Plan (HASP).

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4.2 Personal Protective Equipment

While onsite, subcontractor personnel shall wear personal protective equipment specified in the HASP and applicable work control procedures, which include as a minimum safety glasses, safety-toed shoes, and hard hats.

4.3 Emergency Response

Subcontractor personnel will receive site-specific training detailing how to respond to emergencies (site orientation training per the HASP).

Subcontractor personnel will be trained in the use of fire extinguishers in the mobile NDA trailer.

4.4 Accident Investigation

The subcontractor will provide necessary support to accident investigations involving NDA equipment or subcontractor personnel.

5. MANUFACTURING AND ASSEMBLY

There are no manufacturing and assembly requirements. The subcontractor will provide a mobile NDA trailer that meets the requirements described in the TECHNICAL REQUIREMENTS section.

6. SUBMITTALS

6.1 General Submittal Requirements

6.1.1 Submit the following for review by the contractor prior to award of contract:

6.1.1.1 Detailed description of proposed process, including method for quantifying isotopes and uncertainties

6.1.1.2 Electrical power requirements—voltage, number of phases, wattage.

6.1.1.3 References for successful operation of equipment on similar waste streams

6.1.1.4 Quality Assurance Program documentation

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- 6.1.1.5 Current training status of proposed staff.
- 6.1.2 Submit the following for review by the contractor within 1 week of placement of the contract:
 - 6.1.2.1 Operating procedures, preventive and corrective maintenance procedures, training procedures, and calibration procedures
 - 6.1.2.2 Proof that software is under quality control of the contractor
 - 6.1.2.3 Plan drawings of process trailer (to allow proper siting)
 - 6.1.2.4 Detailed information on all stationary sources, shielding, and safety interlocks
 - 6.1.2.5 Detailed information on sources to be used and associated storage devices.
- 6.1.3 Submit the following during performance of the contract:
 - 6.1.3.1 Startup test report to support Management Self-Assessment
 - 6.1.3.2 Daily validation reports—hard copy and electronic copy. Hard copy will summarize the following parameters:
 - Date and period covered
 - Drum identification numbers
 - Isotopic Pu, Am, U, Np—gram quantities and total measurement uncertainties for each drum
 - Other identified isotopes—gram quantities and total measurement uncertainties for each drum
 - Quality checks
 - Validation findings
 - Problems, non-conformances, and resolutions
 - Signature of validator

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6.1.3.3 Daily electronic copy on a CD to include the above information and also appropriate raw data sufficient to repeat analyses in the future if required.

6.1.4 Final validation report—hard copy and electronic of all daily information in a single report and on a single set of CDs.

6.2 Spare Parts and Special Tools List

Subcontractor does not need to submit a list of spare parts and tools. However, the subcontractor is expected to make necessary arrangements, such that the requirement to have repair parts onsite and to start performing repairs within 24 hours can be met.

6.3 Operating and Maintenance Manuals

Operating and maintenance procedures used by the subcontractor shall be submitted to the contractor within 1 week of contract placement.

6.4 Drawings

None required

6.5 Software

Proof that software is under quality control of the subcontractor shall be submitted to the contractor within 1 week of contract placement.

7. QUALITY ASSURANCE

7.1 Minimum Qualifications of Manufacturer, Supplier, or Personnel

The proposed mobile NDA trailer shall have been previously used to successfully determine the TRU content of similar waste. Per the SUBMITTALS section, the subcontractor shall submit references for successful past operation.

7.2 Quality Assurance Program

The subcontractor shall have an established quality assurance program that meets the requirements of ASME NQA-1. Per the SUBMITTALS section, the subcontractor shall submit documented evidence of the quality assurance program.

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7.3 Nondestructive Examination

Not applicable

7.4 Operational Testing

The subcontractor is responsible for performing and documenting pre-start testing, startup testing, and calibration and quality testing per approved procedures.

7.5 Special Processes

None

8. PACKING AND SHIPPING

8.1 Packing and Packaging

The subcontractor is responsible for safe and secure transportation of the NDA trailer to the INEEL. There are no specific requirements for packing and packaging. It is expected that the subcontractor will transport the NDA trailer in such a fashion that it arrives in working order.

8.2 Marking and Handling

Radioactive sources shall be marked and handled in compliance with INEEL procedures.

8.3 Special Transportation Requirements

The subcontractor is responsible for transporting the trailer to the main security gate at the RWMC. After appropriate clearance has been obtained—including badging, security checks, and a radiological control technician incoming survey—the subcontractor will move the trailer to the Project site. The subcontractor will then remove the tractor from the site. The subcontractor tractor and the tractor operator will need to be surveyed by contractor radiological control technician personnel prior to release from the RWMC.

At the end of the project, the subcontractor will be responsible for providing a tractor to remove the trailer from the site. Both the tractor and trailer will need to be surveyed by contractor personnel prior to release from the site.

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9. INSTALLATION AND MAINTENANCE

9.1 Installation

After the NDA trailer is placed at the site, the subcontractor is responsible for setup of the trailer. The subcontractor will assist, as required, in the hooking up of power to the trailer. Note that the site for the NDA trailer is outdoors. It will be subject to the extreme weather conditions of the Idaho desert. Hot days, wind, and cold nights can be expected during the performance period. Temperatures can range from -40 to 110°F.

9.2 Startup and Calibration

The subcontractor will follow approved procedures for startup and calibration of the trailer. A stepped Management Self-Assessment approach will be used that allows for initial setup of the trailer (e.g., tie-downs and installation of skirting), power hookup, initial equipment checks, calibration, and final release with appropriate assessment at each stage. The subcontractor will assist in the Management Self-Assessment process.

9.3 Training

The subcontractor shall supply personnel completely trained to operate and maintain the equipment. The subcontractor will obtain INEEL site-specific training prior to the start of installation. Required training includes:

- Maintenance procedure training (Standard 101 training)
- Radiological Worker II
- Source handler
- 24-hr HAZWOPER
- RWMC site-specific and Pit-9 site-specific
- Others.

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9.4 Maintenance

The subcontractor is responsible for maintenance of the NDA trailer. The subcontractor is responsible for timely supply of spare parts for the NDA trailer. Timely supply is defined in the TECHNICAL REQUIREMENTS section. Operation and maintenance of the systems shall be described in the operation and maintenance procedures provided, as defined in the SUBMITTALS section.

10. MARKING AND IDENTIFICATION

No modification of subcontractor equipment is required with the exception of identification of sources.

Specific marking and identification of data reports are discussed in the SUBMITTALS section.

11. ACCEPTANCE

11.1 Final Acceptance Method

Final acceptance occurs with acceptance of the final validation report and removal of the NDA trailer from the site.

11.2 Inspection and Hold Points

A pre-start Management Self-Assessment shall be completed, including a review of the procedures and the quality plan before the mobile NDA trailer arrives onsite. A final Management Self-Assessment shall be completed following startup and initial calibration and prior to start of normal assay operation.

11.3 Idaho National Engineering and Environmental Laboratory Surveillance and Audits

The INEEL personnel shall be allowed access to the NDA trailer for surveillance and audits of all phases of setup, calibration, operation, and maintenance.

12. ATTACHMENTS

Attachment A—Isotopic Detection Requirements for Mobile Non-Destructive Assay Trailer

Attachment B—Description of Waste Retrieved and Waste Drums Created by the Project

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ATTACHMENT A

ISOTOPIC DETECTION REQUIREMENTS FOR MOBILE NON-DESTRUCTIVE ASSAY TRAILER

The following is a list of the isotopes that shall be quantified (by measurement or calculation, as specified in approved subcontractor procedures) using the mobile non-destructive assay trailer. It is required that the gram value and the associated total measurement uncertainty for each isotope be reported:

- Pu-238, 239, 240, 241, and 242
- Am-241
- U-233, 234, 235, and 238
- Cs-137
- Co-60.

The minimum detectable limit required is 10 mg Pu-239 fissile gram equivalent.

The last two isotopes are not expected in the waste, but the ability to identify them is specifically required, as they are indicators of fission and activation products that could occur in the waste in Pit 9.

The isotopes are contained in the wastes described in Attachment B.

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ATTACHMENT B

DESCRIPTION OF WASTE RETRIEVED AND WASTE DRUMS CREATED BY THE PROJECT

The information in the following summary was extracted from EDF-2158, *OU 7-10 Glovebox Excavator Method Process Model* (Rev. 0, July 2002).

The waste to be counted in the mobile non-destructive assay trailer is created from drums removed from a small section of Pit 9. Based on shipping records, the waste is thought to consist of only waste shipped from the Rocky Flats Plant. Most of the waste types are similar to those successfully assayed in the Stored Waste Examination Pilot Plant in support of the 3,100-m³ program. (Code 5 was the only waste type not assayed for the 3,100-m³ program.) The waste types and number of drums expected to be removed from Pit 9 for the Project are shown in Table B-1.

As a consequence of the waste being buried and then exhumed, it will be mixed with soil when it is repackaged. The soil and waste are exhumed using an excavator with a scoop. The contents of a scoop are brought into a glovebox in a transfer cart that is lined with a tarp-like liner. After some separation/segregation, the tarp of waste is bagged and placed in a new 55-gal drum. The new drum has a poly liner and will be loaded with two tarps of waste.

Generally, the sludge, combustible, graphite, and non-combustible metal wastes will be repackaged in separate drums. The soil will be repackaged with the sludge waste in 55-gal drums. The combustible and graphite waste will also be repackaged in 55-gal drums. The non-combustible metal waste and the fragments of the old drums will be repackaged in 85-gal drums. The number of repackaged drums is shown in Table B-2.

Some commingling of waste will occur (for example, some graphite in a sludge or metal drum). The non-destructive assay process shall be robust enough to handle this situation and provide the isotopic results defined in Attachment A.

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Table B-1. Inventory Estimate—drums to be removed from Pit 9.

Waste Type/Drum Contents	Identification Code	Estimated Inventory in Pit-9 Excavation Area
741 Sludge: Waste consisting of wet sludge produced from treating aqueous process waste (e.g., ion-exchange column effluent, distillates, and caustic scrub solutions)	Code 1:	1 drum
742 Sludge: Waste consisting of wet sludge produced from treatment of all other plant radioactive and chemical contaminated waste and further treatment of the first-stage effluent	Code 2:	5 drums
743 Sludge: Organic waste (e.g., degreasing agents, lathe coolant, and hydraulic oils)	Code 3:	67 drums
744 Sludge: Waste consisting of liquids adsorbed on a cement mixture	Code 4:	1 drum
745 Sludge: Salt residue generated from concentrating and drying liquid waste from the solar evaporation ponds	Code 5:	8 drums
Graphite: Graphite molds generated by foundry operations and plutonium recovery operations	Code 300:	4 drums
Combustible debris: Waste consisting of dry combustible material (e.g., paper, rags, plastics, and surgeons' gloves)	Code 330:	46 drums
Noncombustible debris: Non-line and line-generated metal waste (e.g., pumps, motors carts, and power tools)	Code 480:	5 drums
Empty drums		97 drums
Total number of waste drums		137 drums

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Table B-2. Repackaged drums.

Material Type/Container Type	Quantities
Combustible waste in 55-gal drums	66 drums
Graphite waste in 55-gal drums	6 drums
Sludge and soil waste in 55-gal drums	464 drums
Metals in 85-gal drums	44 drums